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April 28, 2014

Matthew Waters, P.E.
Stormwater Engineer
City of Annapolis
Department of Neighborhood & Environmental Programs
145 Gorman Street, 3rd Floor
Annapolis, Maryland 21401

Re: Aris T. Allen Boulevard Residential/Rocky Gorge PUD
GRD14-0006, Stormwater Management Review

Dear Mr. Waters:

McLaren Engineering Group respectfully submits the following responses to your review comments received via email, dated 3-13-2014, for the above referenced Grading Permit Plans and Application.

TREES AND LANDSCAPING:

1. COMMENT: *General Notes, Item 7: DNEP 410-263-7946*

RESPONSE: The phone number has been corrected.

2. COMMENT: *Sheet C3.00:*

- a. *Item 9: Please provide a Planting Soils Improvement Plan.*
- b. *Item 10: the fee in question is \$300/tree*

RESPONSE: See Below...

- a) **A Planting Soils Improvement Plan is now provided.**
- b) **Noted. No response required.**

3. COMMENT: *Sheets L1 and L2 through L2.3:*

- a. *Please show all the proposed utilities on the plans (gas, water, sewer, electric, communication, etc.) Numerous large canopy trees are proposed adjacent to proposed underground utilities. Please keep an appropriate distance between the*

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- proposed large canopy trees and the various proposed utilities. Please coordinate this issue with the City's Public Works Department.*
- b. The large canopy trees proposed for the front yards of numerous lots may over time grow too close to the proposed houses. Please consider selecting more appropriate tree species for these locations.*
 - c. The trees shown adjacent to the proposed retaining walls are too close to this wall and on top of an electrical line. Please adjust the plans accordingly.*
 - d. Oak trees are much preferred over maple trees for the Central Green area.*
 - e. The landscape key PRS (Prunus sp.) is shown on the landscape plans but not on the plant list. Please address this issue.*
 - f. Please include a plant list for part 2. Sheet L2.0 shows a plant list for part 1 only.*
 - g. Please include quantities for all plant material on the plant list.*
 - h. In a March 31, 2006 memo from then Environmentalist Marisa Wittlinger to Chief of Current Planning Tom Smith the applicant was required to replant 385 replacement trees as per City Code 17.09. Please show how this planting requirement will be met.*
 - i. All deciduous trees will need to be a minimum of 2" in diameter measured 6" off the ground. All evergreen trees will need to be a minimum of 5' in height. Please adjust the plant list and sheet L2.1 accordingly.*
 - j. Root pruning can be done only by a Licensed Tree Care Expert. Please indicate this on sheet L2.1 under Tree Protection Notes.*
 - k. The limit of disturbance (LOD) will need to be staked. City staff, a Licensed Tree Care Expert and other consultants will need to walk the LOD to determine which trees will be preserved and how that will be done. The LOD may need to be adjusted. All required tree preservation measures as per the Manual (page 3-21, through 3-32), City code 17.09 and the site visit will need to be shown on the plans. Tree preservation measures may include, but not be limited to, root pruning, tree protection fencing, the use of filter logs instead of silt fence, and tree protection matting or a 6" layer of wood chips.*
 - l. Please show on the plans where tree root barriers will be used.*
 - m. Sheet L2.3 shows an incorrect root pruning detail. Please revise the detail.*
 - n. Sheet L2.3 shows an incorrect tree protection detail. Please revised the detail.*

RESPONSE: See responses to each of the items above, as outlined in the comment response letter to the Forest Conservation Plan review (duplicate comments)

EROSION AND SEDIMENT CONTROL:

1. COMMENT: The isolated steep slopes located throughout the site do no warrant additional protection or preservation from a sediment control perspective. It was found that many of

the steep slopes on the site are a product of historic grading for structures, and in some cases were the product of trash and other debris being dumped in the area and covered with fill. Re-grading these areas will present minimal erosion hazard potential.

RESPONSE: Noted.

2. *COMMENT: The contiguous steep slopes that are located adjacent to the proposed conservation easement and within the LOD do not require preservation. It was found that many of the steep slopes on the site are a product of historic grading for structures, and in some cases were the product of trash and other debris being dumped in the area and covered with fill.*

RESPONSE: Noted.

3. *COMMENT: The steep slopes and streams on-site need to be adequately protected from any threats of erosion during and post construction. Revise the proposed sediment control plan to take this into consideration.*

RESPONSE: A substantial riprap outfall is now proposed to adequately protect these area from further erosion.

4. *COMMENT: A phase II sediment control plan, at least a preliminary one, will need to be submitted to evaluate any potential on-site or down-stream impacts that may result from the sediment controls.*

RESPONSE: A "Preliminary Erosion & Sediment Control Plan" is now provided for the overall development (Parts 1 & 2). This plan shows a schematic layout of a sediment trap and earth dikes that will direct sediment laden runoff to the trap.

5. *COMMENT: The sediment trap for phase I will need to be relocated. It is currently proposed to be located in the area with DnA soils, which have a K factor of 0.37 and are considered highly erodible. Buildings may be constructed in areas with highly erodible soils, assuming additional protective measures are taken and soil exposure times are reduced, but sediment traps should not be located in those areas given the concentration of erosive forces sediment traps will need to endure.*

RESPONSE: The sediment trap cannot be relocated as the site drains to the current trap location for Part 1 grading efforts. Upon completion substantial completion of development for Part 1, the trap will then be converted to micro-bioretention facility, MB-3. This is a standard practice in land development, as it allow for the

least amount of land disturbance. Furthermore, our research of the soil type DnA, using the Web Soil Survey website, indicates a K factor of 0.32, and not 0.37. This would mean that DnA soils are in fact not highly erodible.

STORMWATER MANAGMENT

Computations:

6. COMMENT: *The computations for impervious area indicate that the area for porous pavement is not included by the following statement: "A portion of the proposed private North Alley is proposed as porous pavement, with 12 inches of subbase. The area of proposed porous pavement lies within the project limits containing HSG 'B' Soils, that are not within fill. Porous pavement with 12" of subbase, on type 'B' soils shall be considered self-crediting per Chapter 5 of the ESD Manual, Section 5.3 – Alternative Surfaces and thus calculated as pervious area within the ESDv calculations." MDE considers gravel an impervious material and the area should be used in the calculations of ESDv. In the ESD Process and Computations of July 2010 on page 5 and 6 explains the equivalent ESDv per square foot of permeable pavement which can be subtracted from the ESDv Required.*

RESPONSE: Porous pavement is no longer proposed as the City has stated that it is not an acceptable for use within the Private North Alley.

7. COMMENT: *The computations of required ESDv shows the computations of ESDv for each soil group separately, than the sum of these two soils groups are the required ESDv. If you were to look in the ESD Process and Computations – July 2010 publication from MDE on page 15 outlines the computations where you would use the percent impervious for the drainage area, to determine a composite Pe. The Pe number is inserted into the ESDv formula to determine the ESDv required. Rv would be based on the percent impervious for the entire drainage area. A rough estimate using the values in the report yielded ESDv of 27,038 CF required.*

RESPONSE: Revised calculations are provided, in the updated SWM report, that reflect the computation process mentioned above.

8. COMMENT: *The area of the permeable pavement is needed to be known. Performing a rough estimate with scaling the area shown on the plans yields 17,400 SF of porous pavement based on 870 linear feet by 20 feet wide. In the MDE Manual on page 5.48, under the section called Treatment, when applications exceeding 10,000 SF, the application needs to be designed by the methods outlined in Appendix D.13. This project needs to follow this process to ensure that the porous pavement is not at risk of failure. More computations for this area is required.*

RESPONSE: Porous pavement is no longer proposed as the City has stated that it is not an acceptable for use within the Private North Alley.

9. **COMMENT:** *The director of the department has indicated that she does not want permeable pavement on main traveled roads. With the driveways for all the attached townhouses off of the private alley north, this could cause problems. This alley way will likely have potential for significant impairment from several contributing factors, like grit from tires of the vehicles, snow plows and salt trucks. Another concern is when garbage is picked up, if the trucks will be using this alleyway, there will be more opportunities for the clogging the permeable pavement is possible. Finally, if there is any plans for utilizing the entrance from Aris T. Allen Boulevard to the development via the private alley north, this would significantly increase the traffic on this alleyway.*

RESPONSE: Porous pavement is no longer proposed as the City has stated that it is not an acceptable for use within the Private North Alley.

10. **COMMENT:** *The drywells area stated to store 106 cubic feet of ESD volume. No dimensions for the drywells are included in the report. When scaling from the plans, the dimensions for the drywells seem to be 11 feet by 4 feet and 5 feet deep. The depth was obtained from the detail in the plan set. These dimensions provide a volume of 220 CF. Using a void factor of 0.4, these drywells will only yield 88 CF of ESDv treatment. Please provide the dimension of each drywell and the contributing impervious area to each drywell.*

RESPONSE: The SWM report has been revised to include the dimensions of each drywell, and individual calculations of roof drainage area to each drywell, and volume of runoff stored in each. The plans (C10.00) also now shows the dimensions for the drywells.

11. **COMMENT:** *In the MDE manual, micro-bioretenction practices shall limit the drainage area to 20,000 SF or less. MB-4, 6, 7, 8, 9 and 10 are all less than 20,000 SF and all the others are over the limit. Can this be revised to address, especially for MB-2 and MB-13 where the drainage area is over 25,000 SF.*

RESPONSE: The micro-bioretenction facilities have been revised to limit the corresponding drainage areas to 20,000 SF and less.

12. **COMMENT:** *The surface area (Af) for all micro-bioretenction practices have not been provided. Additionally, no dimensions for the areas were provided in the plans.*

RESPONSE: The surface area has been provided within the SWM report for each micro-bioretenction facility, as well as the breakdown of the volume stored within each.

- 13. COMMENT:** *The P_e for the designed micro-bioretenion areas have not been calculated using equation 5.2 from the MDE Manual on page 5.98. This P_e number should then be used to determine the ESD_v provided, which would be limited by the ESD_v max.*

RESPONSE: The above referenced method for calculating the P_e (using equation 5.2 from the MDE Manual on page 5.98) should be used in calculations at the concept phase. If you reference page 36 of the Environmental Site Design (ESD) Process & Computations July 2010, the final design method should outline the total combined storage within the various media layers and ponding depth. The size of the micro-bioretenion facility should be designed to store a minimum of 1" of runoff ($P_e = 1"$), and a maximum of 2.7" of runoff (1-year 24-hour storm for this region).

Plans:

1. **COMMENT:** *On sheets C6.10 and C6.20, the general notes reference Sheet C5.0 for the horizontal geometry of the proposed roadway. This is the site dimension plan. The notes also reference C11.1 for storm sewer calculations. This sheet only has stormdrain profiles.*

RESPONSE: The notes have been removed from sheets C6.10 and C6.20, as to avoid confusion.

2. **COMMENT:** *On sheet C6.20 the proposed wall along Yawl Road is not labeled. Please label this.*

RESPONSE: The proposed retaining wall along Yawl Road is now labeled.

3. **COMMENT:** *On sheet C7.00, there is something shown on the private alley south near the marker 34. Is this an asphalt berm and how is runoff entering the pipe in this area near MB-3.*

RESPONSE: This is a proposed trench drain (storm drain structure #34).

4. **COMMENT:** *On sheet C7.00, the drywells provided for Unit B and Unit C may potentially cause flooding in the basement of these units along Yawl Road. Additionally, these drywells appear to be within 10 feet of the units. The MDE Manual states on pages 5.91 and 5.94 that drywells should not be placed in areas where their operation may cause basement flooding and should be a minimum of 10 feet from buildings. This area may not be a good application for drywells due to site constraint and distance to the structures.*

RESPONSE: The drywells are in fact sited 10 feet away from the proposed building foundations.

5. *COMMENT:* There is significant earthwork proposed of a temporary pipe shown on Sheet C8.00. Is this necessary?

RESPONSE: The "ravine" is no longer proposed, and the full storm drain trunk line is proposed instead. This will eliminate steep slopes, while providing an outfall for the sediment trap, and ultimate Part 1 build-out.

6. *COMMENT:* On sheet C9.00, the plans provide the time of concentration for the existing conditions. Please provide the TR-55 to confirm this information with the report.

RESPONSE: A full calculation has been shown on sheet C9.00 in order to illustrate how the time of concentration was calculated for the existing drainage area. A TR-55 would not yield an accurate Tc, as the drainage area is relatively small. The rational method is the most appropriate method for calculating the Tc for this site.

7. *COMMENT:* On Sheet C10.00:

- a. There is no scale provided for this sheet.
- b. At the proposed outfall of the site (structure 1), has any computations been done to indicate what the flow rate at this structure will be and has this area been investigated to ensure that a stable outfall is present?
- c. Please provide the location of observation wells on the plans.
- d. The detail for the drywells is not clearly labeled.
- e. The detail for the drywells indicates two options for the layout. Please indicate which one the contractor is to use for each drywell.
- f. The depth between the top of the grade to the top of the drywell needs to be known for each drywell.
- g. The detail indicates that a mitered drain is to be used as an overflow from the drywell. Where is this going to be discharged? Permeable pavement cannot accept run on, due to decrease of effectiveness and increase of sedimentation and clogging of the permeable pavers.
- h. There is no reference to the micro-bioretenention (MB) detail on Sheet C16.40 on this sheet.
- i. Please show how the underdrain shown in the MB detail is going to be laid out.
- j. The typical porous pavement detail shows the reservoir layer thickness as varies, with 12" minimum. The stormwater management report stated that the thickness will only be 12". Please verify this.

RESPONSE: On Sheet C10.00:

- a. A graphic scale is now provided.
- b. Refer to Sheet C11.20, for riprap length analysis. The required minimum length for the riprap outfall is 20 ft. We are proposing a riprap outfall length of 60 ft. This will mitigate for the runoff as a result of new development, and mitigate existing erosion problems in the outfall location.
- c. The Drywell Detail clearly shows the location of where the observation wells should be placed based on Drywell orientation. Further depiction in plan view of the observation wells is unnecessary, and will only clutter the drawings.
- d. The Drywell Detail is now clearly labeled.
- e. Both options are to be used. The orientation of each drywell has already been determined as to provide the required clearance from the basement foundations. A note to the contractor has been provided within the drywell detail. Additionally, the location and orientation of each drywell is clearly shown on the plans, and sufficient information has been provided so that a contractor can correctly install these facilities.
- f. A depth of 12" (from finished grade to top of drywell) has been clearly outlined on the Drywell detail. This applies to all drywells site wide.
- g. This overflow pipe option has been crossed off of the drywell detail, as to avoid confusion.
- h. A note has been added to reference sheet C16.40 for all micro-bioretenention facility details.
- i. Underdrains and their orientation are now shown for all micro-bioretenention facilities.
- j. The porous paving detail has been removed, as we are no longer proposing the use of porous pavement.

8. *COMMENT: On sheet C11.00, the time of concentration has been shown for the drainage areas for part one, no computations have been provided to verify these.*

RESPONSE: A chart has been added to sheet C11.00, illustrating how the Time of Concentration (Tc) is derived for small drainage areas, based upon the 'C' factor.

9. *COMMENT: On sheet C11.10, no information has been provided for the temporary pipe on this sheet.*

RESPONSE: This comment is no longer applicable, as the temporary pipe is no longer proposed.

10. COMMENT: On sheet C16.40:

- a. *The typical sections for the MB indicates that the view is perpendicular and parallel to the underdrain. No underdrain has been shown for these areas.*
- b. *The details do not show any inflows or level spreading techniques like riprap on them.*

RESPONSE: On Sheet C16.40:

- a. **Underdrains are now shown for all micro-bioretenion facilities.**
- b. **Riprap for pipe outfalls and level spreaders are now shown on the revised plans, and addressed as notes #5 and #6 on sheet 16.40, "Specifications for Biofiltration".**

11. COMMENT: *The microbioretenion area MB-4 is located in an area with highly erodible soils and an area that has the HSG classification of C. Microbioretenion can be in this type of soils but the combination of HSG C and highly erodible soils, this might not be the best location for this type of facility. It was noted during a field walk that this area was retaining water several days after a rain event.*

RESPONSE: The location for MB-4 cannot be changed as this SWM open space has already been platted as such and for that specific use. Furthermore, we have reviewed the Web Soil Survey for the soil profile, and found that DnA soils only have a K factor of 0.32, and thus is not considered to be highly erodible.

12. COMMENT: *The outfall at structure 60 is discharging runoff from impervious and pervious pavement along the private alley. The impervious area does not provide any treatment for the new impervious. Has the possibility of using bioswales along the alley and Yawl Road extension where no houses are being placed been explored?*

RESPONSE: Infiltration trenches are proposed within the Private North Alley to manage and treat runoff.

13. COMMENT: *The area where structure 1 and structure 60 are located is the ultimate outfall from the site and downstream of this area was noted to have some erosion in the existing conditions. This is a major concern for this project and the area that will likely have major impacts long term. The flow rate from these structures will be considerably higher than the existing conditions which will be detrimental to the area downstream. Downstream restoration and methods for reducing the flow rate at the outfall may be required for this project.*

RESPONSE: A substantial riprap pad and outfall area is proposed to eliminate erosion concerns, by reducing and dissipating runoff velocities.

Please submit eight (8) copies of the revised plans to the Dept. of Neighborhood & Environmental Programs. Note, this does not include possible Environmental, Planning & Zoning, Public Works or Stormwater Management plan review comments.

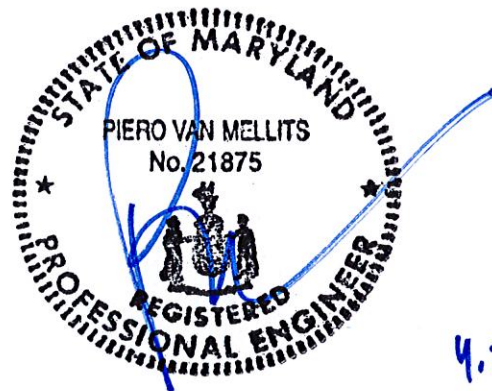
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Very truly yours,

The Office of
McLaren Technical Services, Inc.
d/b/a McLaren Engineering Group



Piero "Pete" V. Mellits, P.E., LEED AP
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